

Impact Statement Coding of Self-Related Thought in Women With Posttraumatic Stress Disorder

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Clinical and empirical studies have documented significant alterations in self-related thought in posttraumatic stress disorder (PTSD). To our knowledge, however, few studies have examined self-referential cognition by analyzing survivors' written impact statements in individuals whose PTSD is due to interpersonal trauma. In the current study, we performed a linguistic analysis of impact statements (i.e., descriptions of how the trauma has affected the survivors' views of themselves, others, and the world) collected at the start of therapy from women with PTSD that was due to interpersonal trauma, with the goal of determining whether PTSD symptom clusters were associated with altered self-referential thought. We found that higher levels of PTSD-related hyperarousal symptoms were significantly associated with diminished self-related word use, after controlling for depression severity, $f^2 = .31$. Similarly, diminished negative self-related word use was associated with higher levels of hyperarousal symptoms, $f^2 = .47$. Our findings align with previous research that has provided evidence for a diminished sense of self in PTSD. These results may help inform targeted interventions aimed at improving social-affective functions in PTSD and other psychiatric conditions.

Posttraumatic stress disorder (PTSD) is a psychiatric condition associated with cognitive and affective symptoms that include intrusive thoughts, avoidance or emotional numbing, and hyperarousal (American Psychiatric Association [APA], 1994). The lifetime prevalence rate of PTSD in the United States is relatively high at 6.1% (Goldstein et al., 2016), with severe symptoms often lasting up to 10 years after onset (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Recent epidemiological research further suggests that PTSD is prevalent cross-nationally (Koenen et al., 2017), although incidence may vary by trauma type, as exposure to interpersonal violence is associated with the highest risk of developing PTSD (Kessler et al., 2017). Given the national and international rates of PTSD, understanding the cognitive and emotional processes that contribute to its onset and maintenance is crucial.

Alongside the diagnostic symptoms associated with PTSD, individuals with PTSD also often exhibit significant alterations in self-related thought, such as memories of personal semantic or episodic information or evaluation of one's own feelings or

actions. Clinical and empirical reports suggest that PTSD can be associated with a diminished sense of self. For example, PTSD and chronic interpersonal trauma have been associated with a loss of a coherent sense of self or identity and the experience of a fragmented self (Brewin & Holmes, 2003; Herman, 1997; Janoff-Bulman, 1992; van der Kolk et al., 2005). Further, some researchers have suggested that altered perceptions of self may be particularly prevalent in women who have experienced interpersonal violence (Freer, Whitt-Woosley, & Sprang, 2010). Similarly, dissociative symptoms in PTSD, which include feelings of depersonalization or derealization, are indicative of a diminished sense of self (Lanius, Bluhm, & Frewen, 2011). Cognitive theories of PTSD also suggest that dysfunctional self-referential thought can contribute to the development of PTSD (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Janoff-Bulman, 1992; McCann & Pearlman, 2006). For example, a self-report measure that assesses changes in the sense of self in PTSD, the Posttraumatic Cognitions Inventory (PTCI), includes items consistent with an altered sense of self, such as "I feel like I don't know myself anymore," "I feel dead inside," or "I feel like an object, not a person" (Foa et al., 1999).

In addition to a reduced sense of self, studies have also consistently associated PTSD with more negative self-related thought, such as negative self-appraisal (e.g., feelings of inadequacy; Bryant & Guthrie, 2007; Dunmore, Clark, & Ehlers, 1999; Foa et al., 1999) and repetitive thinking about negative aspects of oneself (i.e., rumination; Birrer & Michael, 2011; Ehlers, Mayou, & Bryant, 1998). For example, in a study that used the PTCI, researchers found that high levels of negative

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self-appraisal prior to trauma exposure predicted PTSD diagnosis as well as PTSD symptoms after trauma exposure (Dunmore et al., 1999). Together, these findings suggest that PTSD can be associated with both a reduced sense of self and enhanced negative self-related thought. Previous studies, such as those cited, have primarily used self-report measures or clinical evaluations of symptoms to characterize changes in the sense of self in PTSD. However, another method that has been used to examine changes in cognition associated with PTSD, including thoughts about oneself, is the linguistic analysis of written or spoken language.

Previous linguistic research has yielded important insights into the associations between patterns of language use and PTSD (Crespo & Fernández-Lansac, 2016; O’Kearney & Perrott, 2006). For example, several studies have found that reducing cognitive distortion (e.g., overaccommodated beliefs) after trauma, as measured through qualitative coding of written impact statements, is linked to symptom reduction in PTSD following cognitive processing therapy (e.g., Dondanville et al., 2016; Iverson, King, Cunningham, & Resick, 2015; Sobel, Resick, & Rabalais, 2009). Other research has examined the use of self-related (e.g., I, me, my) and negative emotional words (e.g., sad, afraid) in both trauma-focused and non-trauma-focused narratives in relation to PTSD (Crespo & Fernández-Lansac, 2016; O’Kearney & Perrott, 2006). Based on qualitative coding of trauma narratives, Freer and colleagues (2010) found that a high proportion of victims of interpersonal violence referenced alterations in their sense of self. Narrative studies have also provided some evidence for deficient use of self-referential language in PTSD. For example, a study that examined personal life story narratives of individuals who had experienced interpersonal trauma as children found that these individuals used significantly fewer self-references than non-trauma-exposed controls (Klein & Janoff-Bulman, 1996). In a study by Lindblom and Gray (2010), female participants were more likely to focus on details about other people present during the traumatic event. However, another report revealed that using more first-person singular pronouns 1 week following a traumatic event (i.e., the September 11, 2001, terrorist attacks) predicted a higher level of PTSD symptoms 5 months later (D’Andrea, Chiu, Casas, & Deldin, 2012).

In terms of negative emotions, results from several narrative studies have indicated that the use of more negative emotion-related words is associated with a higher level of PTSD symptom severity (Crespo & Fernández-Lansac, 2016; Greenhoot, Sun, Bunnell, & Lindboe, 2013). However, other studies have suggested that the expression of negative emotion may be reduced in PTSD. For instance, D’Andrea and colleagues (2012) found that individuals who reported fewer anxiety-related words 1 week after trauma exposure had more severe PTSD symptoms after 5 months. Similarly, a separate study showed that individuals with PTSD due to interpersonal trauma or serious traffic accidents used fewer anxiety-related words than trauma-exposed individuals without PTSD (Jelinek et al., 2010). In sum, the findings thus far from narrative re-

Table 1
Participant Characteristics and Study Variables

Variable	<i>M</i>	<i>SD</i>	Range
Age (years)	28.56	7.83	18–55
Years of education	15.52	2.08	11–20
PTSD severity ^a	64.88	16.35	37–97
Reexperiencing ^b	18.06	5.36	7–28
Avoidance/numbing ^b	25.03	8.47	11–40
Hyperarousal ^b	21.78	6.88	6–35
BDI-II	23.28	11.07	5–46
Self-related ^c	0.53	0.16	0.23–0.83
Negative self-related ^c	0.31	0.19	0.00–0.75

Notes. PTSD = posttraumatic stress disorder; BDI-II = Beck Depression Inventory–Version II.

^aTotal score on the Clinician-Administered PTSD scale (CAPS). ^bScores on cluster-related items within the CAPS. ^cProportion of impact statement sentences for each category.

search suggest that the use of self-relevant words and negative emotional words may be either increased or decreased in PTSD. However, in these previous studies, researchers either did not use impact statements for their language sample or did not specifically examine the use of self-referential language, including self-reference and negative self-reference, in relation to PTSD symptom clusters in women with PTSD caused by interpersonal trauma.

In the present study, we therefore performed a linguistic analysis of impact statements for women with PTSD that occurred as a result of interpersonal trauma to determine whether PTSD symptom clusters were associated with altered self-referential thought. First, we tested the hypothesis that PTSD symptom clusters would be associated with self-related thought. Second, we tested the hypothesis that PTSD symptom clusters would be related to negative self-related thought.

Method

Participants and Procedure

A total of 32 women between 18 and 55 years of age who had been diagnosed with PTSD were included in the study as part of a larger National Institute of Mental Health study examining the neural correlates of PTSD in women who have experienced an interpersonal trauma. All participants were recruited at a multi-disciplinary center at a large Midwestern university that primarily treats adult women who have experienced interpersonal trauma. All participants gave informed consent according to a protocol reviewed and approved by the institutional review board at the university. Participant characteristics are presented in Table 1. Participants were included if they were a woman between the ages of 18 and 55 years, had experienced an interpersonal trauma (i.e., physical or sexual assault, molestation, or intimate partner violence) in childhood or adulthood, and

met the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. text rev.; *DSM-IV-TR*; APA, 2000) criteria for PTSD at the time of the initial assessment, with the interpersonal trauma reported as their Criterion A event. All participants reported that their most recent traumatic event had occurred at least 1 month previously. Other comorbid conditions were permitted for this study as long as PTSD was the primary diagnosis. Exclusion criteria for the study included active suicidality, Axis II disorders, current alcohol or substance abuse disorder, schizophrenia or other psychotic disorder, bipolar disorder, and current use of psychotropic prescription or nonprescription drugs. In addition, participants were excluded from the sample if they were involved in a currently abusive relationship or were being stalked.

Treatment. Cognitive processing therapy (CPT), based on a social cognitive theory of PTSD, is a 12-session evidenced-based therapy for the treatment of PTSD (Resick & Schnicke, 1992) that consists of a combination of cognitive restructuring and emotional processing of trauma-related stimuli. It has been shown to be highly effective at reducing symptoms of PTSD and comorbid depression and anxiety (Healy, Walter, & Chard, 2016; Resick, Nishith, Weaver, Astin, & Feuer, 2002). One component of CPT includes an exercise that has the patient compose an impact statement in which they are instructed to write at least one page describing how the traumatic event has impacted their beliefs about themselves, others, and their overall perception of the world in general. Moreover, they are asked to consider how the traumatic event has impacted the following topics: safety, trust, power/control, esteem, and intimacy. Impact statements collected at the end of the first CPT session were chosen as the language sample for the present study because they are focused on an individual's beliefs about themselves and others, which are thought to be significantly changed after a traumatic event (e.g., Foa et al., 1999; Resick & Schnicke, 1992).

Coding of impact statements for self-related thought. Impact statements were coded using a qualitative approach to assess self-related and negative self-related thought. Each sentence within each impact statement was coded based on focus, including self-related and other-related (as in Exner, 1973; Philippi et al., 2018). Self-related responses referred to the self, with little regard for other persons, whereas other-related responses discussed the characteristics, mental states, or actions of other people. Final scores corresponded to the sum of all responses for each response category out of the total number of sentences in the impact statement. To examine negative self-related thought, each sentence was also coded for overall valence (positive, negative, or neutral), which resulted in three relevant focus-by-valence categories (self-positive, self-negative, self-neutral, as in Ingram & Smith, 1984; Philippi et al., 2018).

Two raters trained in qualitative coding for self and other focus and blind to the study hypotheses coded responses in

two steps. First, each rater separately coded impact statement sentences for focus and valence for all participants. Interrater reliability was calculated for all ratings, and adequate reliability was found for all response categories used in the present study. Specifically, self-related and negative self-related responses had intraclass correlation coefficients of .72 and .70 (i.e., 97% and 86% agreement), respectively, which was within acceptable limits for similar coding procedures (Exner, 1973). Second, the raters took turns reading each sentence in every participant's statement out loud. When their coding differed for a sentence, the raters discussed their response and the rationale for their rating until they came to an agreement on one final code for each response (e.g., self-related and negative valence). They were able to reach an agreement for all sentences, and these final codes were used in the analyses.

Based on our hypotheses for the current study and previous research that used a similar coding procedure (Ingram, Lumry, Cruet, & Sieber, 1987; Ingram & Smith, 1984; Philippi et al., 2018), the proportion of both self-related and negative self-related responses were calculated (e.g., number of self-related responses/total number of sentences in the impact statement). Examples of self-related responses are: "I feel broken" (negative self-related) or "I am stronger because of what happened" (positive self-related).

Measures

PTSD symptoms. The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) is a 30-item scale that assesses the validity, severity, and improvement of *DSM-IV-TR* PTSD symptoms over a time period of interest (e.g., past week, past month, lifetime). These symptoms are classified into three groups: reexperiencing (Criterion B), avoidance/numbing (Criterion C), and hyperarousal (Criterion D). In the current study, the 1-month and lifetime time periods for each individual symptom were assessed. The CAPS also contains separate 5-point frequency and intensity rating scales (0–4) for each symptom. The CAPS has demonstrated high internal consistency (Cronbach's $\alpha = .92-.99$; Blake et al., 1995) and is an accepted, valid measure of PTSD symptoms and diagnosis. The internal consistency of the CAPS in this sample was high, Cronbach's $\alpha = .95$.

Depression. The Beck Depression Inventory–II (BDI-II; Beck, Steer, & Brown, 1996) was chosen to measure self-reported symptoms of depression. The BDI-II is one of the most widely used and validated tools to assess depression symptoms (Beck et al., 1996). The BDI-II consists of 21 items that assess depressive symptoms, such as worthlessness, loss of energy, and fatigue. Each item is rated on a scale from 0 to 3 (0 indicating an absence of symptoms and 3 indicating the maximum severity). An example item states, "I cry over every little thing." The scores across all items were summed up to calculate the total depression score for each participant. Total depression scores can range from 0 to 63, with higher scores indicating a higher

level of depressive symptom severity. There was high internal consistency for the BDI-II in the current sample, Cronbach's $\alpha = .90$.

Data Analysis

We used multiple linear regression to analyze the association between PTSD symptom clusters and self-related thought from the impact statements while controlling for depression; SPSS (Version 24) was used for analyses. Specifically, two regression analyses were conducted for CAPS symptom cluster (reexperiencing [RE], avoidance/numbing [A/N], and hyperarousal [H]) severity scores for the past month

$$Y_{\text{self-related}} \sim \text{RE} + \text{A/N} + \text{H} + \text{BDI-II} \quad (1)$$

$$Y_{\text{negativeself-related}} \sim \text{RE} + \text{A/N} + \text{H} + \text{BDI-II} \quad (2)$$

In the regression models above, Y represents the proportion of self-related or negative self-related responses (dependent variable), and the PTSD symptom clusters (RE, A/N, H) and depression (BDI-II) scores correspond to the predictors/independent variables. Effect sizes (Cohen's f^2) were calculated for all significant and marginal results. Due to the smaller sample size, we also performed an a priori power analysis based on our significant regression results using G*Power (Version 3.1; Faul, Erdfelder, Buchner, & Lang, 2009). Based on this a priori power analysis, a sample size of between about 41–60 would be needed to achieve a power of 0.95 with an effect size of between 0.47 and 0.31, as reported in the Results section.

Results

Participant Characteristics

Participants reported a mean age of 28.56 years ($SD = 7.83$) and a mean educational attainment of 15.52 years ($SD = 2.08$). See Table 1. Participant age, $ps = .307-.714$, and education, $ps = .083-.609$, were not significantly correlated with any of the variables of interest in the study; therefore, age and education were not included as covariates in the analyses reported herein. Due to the correlation between depression and PTSD severity in the sample, $r = .62$, as well as the consistent association between depression and elevated self-related and negative self-related thought reported in previous studies (Ingram et al., 1987; Philippi et al., 2018; Woodruff-Borden, Brothers, & Lister, 2001), we included BDI-II scores as covariates in all regression models. Collinearity statistics for all covariates were within normal limits, VIFs = 1.2–2.0, tolerance range: 0.5–0.8.

Participants' impact statements varied in length and included a mean of 23.25 sentences ($SD = 15.28$, range: 3–66). There were no significant correlations between the number of sentences and PTSD severity, PTSD symptom clusters, or BDI-II scores, $ps = .277-.716$. The mean proportions of self-related thought and negative self-related thought are reported in Table 1.

Table 2

Multiple Linear Regression for Posttraumatic Stress Disorder (PTSD) Symptom Clusters and Self-Related and Negative Self-Related Thought

Variable	Self-Related Thought ^a			Negative Self-Related Thought ^b		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Constant	0.64	0.11		0.41	0.13	
Reexperiencing	−0.00	0.00	−.16	−0.01	0.01	−.20
Avoidance/ numbing	0.00	0.00	.04	0.01	0.00	.31
Hyperarousal	−0.01	0.00	−.49*	−0.02	0.01	−.56*
BDI-II	0.01	0.00	.60**	0.01	0.00	.46*

Notes. BDI-II = Beck Depression Inventory-Version II.

^aRegression model with self-related thought: $R^2 = .29$, $ps = .009-.855$.

^bRegression model with negative self-related thought: $R^2 = .32$, $ps = .019-.268$.

* $p < .05$. ** $p < .01$.

PTSD Symptoms and Self-Related Thought

For the first regression model with all PTSD symptom clusters (Table 2), we found that hyperarousal symptoms were significantly associated with self-related word use after controlling for BDI-II scores, $\beta = -.49$, $t(27) = -2.12$, $p = .044$, $f^2 = 0.31$. There were no significant associations between the reexperiencing or avoidance/numbing symptom clusters and self-related word use. These findings suggest that higher levels of hyperarousal symptoms were associated with diminished self-referential cognition.

PTSD Symptoms and Negative Self-Related Thought

For the second regression model, which included all PTSD symptom clusters (Table 2), hyperarousal symptoms were also significantly associated with negative self-referential thought after controlling for BDI-II scores, $\beta = -.56$, $t(27) = -2.49$, $p = .019$, $f^2 = 0.47$. There were no significant associations between the reexperiencing or avoidance/numbing symptom clusters and negative self-related cognition. These results suggest that a higher level of hyperarousal symptoms was associated with reduced negative self-referential thought. The findings further reveal that depression severity was associated with elevated self-related and negative self-related thought when included in the models.

Discussion

In the current study, we investigated language use in impact statements that were completed at the start of therapy to determine whether self-related thought was associated with PTSD symptom clusters. Our results provide support for our hypotheses and demonstrate significant associations between PTSD symptom clusters and self-related thought, after

controlling for depression severity. First, higher levels of PTSD-related hyperarousal symptoms were significantly associated with diminished use of self-relevant language in the impact statements. Second, similar to findings for self-related thought, higher levels of hyperarousal symptoms were significantly associated with decreased negative self-referential word use. For all analyses, depression severity was associated with elevated self-related and negative self-related thought when included in the models.

When we examined the PTSD symptoms by each of the three clusters, only hyperarousal symptoms were significantly associated with reduced use of self-referential language. These findings mirror results reported in a previous study in which increased use of “we” words was correlated with fewer acute PTSD symptoms, including hyperarousal symptoms, in individuals experiencing traumatic symptoms related to the September 11, 2001, terrorist attacks (D’Andrea et al., 2012). Our results are inconsistent with what was reported in one study in which the authors found that first-person pronoun use was a significant predictor of the severity of self-reported hyperarousal symptoms in women exposed to interpersonal violence (Fernández-Lansac & Crespo, 2017). One potential explanation for this discrepancy is related to differences between studies in terms of participant samples. The study by Fernández-Lansac and Crespo (2017) included trauma-exposed women regardless of whether they met criteria for PTSD whereas our study included only women who met clinical criteria for PTSD. Another possible reason for this inconsistency between studies could be related to differences in depressive symptoms, which have been reliably shown to be associated with more self-focus (e.g., Ingram et al., 1987; Ingram & Smith, 1984; Philippi et al., 2018); these were not controlled for in the previous study. Further research will be needed to replicate our results. Broadly, our results may be relevant to previous clinical and empirical reports of a fragmented or less coherent sense of self in PTSD (Brewin & Holmes, 2003; Herman, 1997; Janoff-Bulman, 1992; Lanius et al., 2011; van der Kolk et al., 2005). It is important to note, however, that we found significant associations between diminished self-reference and hyperarousal symptoms only as opposed to other PTSD symptom clusters. Although few studies have explicitly examined hyperarousal symptoms in relation to self-related thought, our findings are relevant to the symptoms and/or behavioral impairments associated with hyperarousal. For example, individuals with more severe symptoms of hyperarousal (e.g., hypervigilance and difficulty concentrating) would likely have increased attention to external stimuli as compared with internal stimuli, thereby reducing thoughts about oneself. Consistent with this proposal, healthy individuals tend to think about themselves less often when performing difficult cognitive tasks that require them to attend to external stimuli (see Smallwood & Schooler, 2006, for a review). Relatedly, hyperarousal symptoms in PTSD have also been associated with alexithymia or the inability to identify and label emotions (Declercq, Vanheule, & Deheegher, 2010; Frewen et al., 2008), which suggests that conscious attention to

one’s own emotions may be reduced when hyperarousal symptoms are high. However, it will be important for future studies to investigate whether hyperarousal symptoms in PTSD are associated with diminished self-referential cognition across different self-related tasks or measures. For instance, other studies have shown associations between hyperarousal symptoms and increased reports of physical symptoms of somatic illnesses (Kimerling, Clum, & Wolfe, 2000). Although speculative, it is possible that hyperarousal symptoms may be associated with increased reference to bodily aspects of oneself but also with decreased self-reference in terms of psychological or emotion-related aspects of oneself.

There were no significant associations between PTSD symptom clusters and increased negative self-related thought. These null results were somewhat surprising given that previous studies have consistently reported increased negative self-appraisal and rumination in relation to PTSD assessed with self-report measures (Birrer & Michael, 2011; Bryant & Guthrie, 2007; Dunmore et al., 1999; Ehlers et al., 1998; Foa et al., 1999). However, these previous studies used self-report measures and thus did not examine the use of negative self-related words in a language sample in relation to PTSD. One potential explanation for these discrepant findings is that the frequency of negative self-referential cognition in PTSD is different in language use as compared with self-report measures. Empirical research will be necessary to determine whether this is the case in PTSD as no studies to our knowledge have directly compared self-report and narrative approaches for measuring negative self-related thought in PTSD. Another possibility is that PTSD symptom clusters are uniquely associated with divergent levels of negative self-referential cognition. In line with this hypothesis, we found in the current study that hyperarousal symptoms were significantly associated with reduced negative self-related word use whereas avoidance and numbing symptoms were marginally associated with increased negative self-related word use. However, future studies are warranted in order to replicate these findings with larger samples sizes. Another interpretation of the null results is that they may be due to differences in trauma type and/or the presence of depressive symptoms. Future research in individuals with PTSD stemming from different trauma types will be necessary to determine whether these factors are associated with distinct patterns of negative self-evaluation. Finally, it is possible that the null results were due to the relatively small sample size in this study. As mentioned in our discussion of study limitations, larger sample sizes will be crucial to replicate these findings.

More broadly, the present study also contributes to research concerning self-referential processing in different psychiatric populations (for a review see Lanius et al., 2011; Philippi & Koenigs, 2014). For example, a higher level of negative self-focus has been observed using a sentence completion task in patients with depression symptoms (Ingram et al., 1987; Ingram & Smith, 1984; Philippi et al., 2018) and anxiety (Woodruff-Borden, Brothers, & Lister, 2001). In addition, self-referential

cognition, especially when unfavorable, has been found to prolong negative affect and predict and maintain psychiatric conditions, including depression and PTSD (Dunmore et al., 1999; Just & Alloy, 1997; Mor & Winquist, 2002; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Based in part on the aforementioned findings, it has been suggested that self-related thought may be a transdiagnostic domain of psychological dysfunction that could be measured and targeted with treatment (Philippi & Koenigs, 2014). For example, preliminary clinical studies have indicated that therapies targeting negative self-referential thought patterns, such as rumination-focused cognitive behavioral therapy, may be beneficial in enhancing treatment outcomes (Watkins, 2015). However, additional replication and treatment studies will be required to determine whether interventions that target self-related thought are more effective than nontargeted treatments at restoring healthy levels of self-related cognition.

Although the current study had several strengths, there are a few limitations that should be noted. First, the sample size was relatively small ($N = 32$), which may have impacted our ability to detect significant results. Therefore, the findings from this study should be replicated in a larger sample (e.g., 40–60 participants). Second, the sample included only female participants with PTSD attributed to interpersonal trauma. It is possible that self-referential word use would differ in male individuals and/or participants with exposure to different types of trauma. For example, Lindblom and Gray (2010) found that female participants mentioned other people more often in their narratives. In addition, a study that found more first-person pronoun use to be associated with more chronic PTSD symptoms included male participants and individuals exposed to the September 11, 2001, terrorist attacks (D'Andrea et al., 2012). In terms of differences in self-referential thought by trauma type, some researchers have suggested that exposure to interpersonal trauma may be particularly harmful to one's sense of self (Freer et al., 2010). Therefore, it will be crucial in subsequent studies to examine whether the use of self-related words in language samples in relation to PTSD differs for male participants and/or individuals exposed to different trauma types. Third, we used impact statements for our language analysis, which have not been used in previous language analysis studies of self-referential thought in PTSD. The use of self-related and negative self-related words in relation to PTSD could vary across language samples or within an individual. For instance, it is possible that negative self-referential language would differ in an impact statement versus an emotionally neutral language sample. Future research could characterize the use of self-related and emotion-related words across different types of language samples in PTSD, including controlling for baseline levels of self-referential language. Fourth, we examined whether PTSD symptoms were associated with self-related thought. Given that it is possible that the association is bidirectional, we also performed the analyses with self-related word use as the predictor of PTSD symptoms, and the results remained the same. Finally, we only examined the use of self-referential language

as collected at one time point before therapy. Consequently, further treatment studies investigating self-related word use before and after therapy will be necessary to understand whether self-referential language is normalized after successful treatment.

In sum, we demonstrate novel findings linking PTSD severity and symptom clusters with reduced self-related thought, even after controlling for depression severity. The use of diminished self-related and negative self-related words was associated with hyperarousal symptoms of PTSD. These findings underscore a key dimension of social-affective functioning that is worthy of future research as it may cut across different psychiatric disorders.

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